CHAPTER 6

RIGID PAVEMENT INLAY DESIGN

6-1. General. A method commonly used to rehabilitate distressed facilities is to construct an adequately designed rigid pavement inlay section in the center of the facility. These inlays are generally 50 feet wide for taxiways and 75 feet wide for runways; however, the widths will be influenced by the lateral traffic distribution and, in existing rigid pavements, by the joint configuration. The inlay pavement may consist of any type of rigid pavement discussed in chapters 2 through 4. The thickness design of the rigid inlay will be the same as outlined in chapters 2 through 4 except for special requirements presented herein. Because of the mobilization nature of this type of rehabilitation program, some design requirements may be waived and rapid construction procedures may be required as outlined herein.

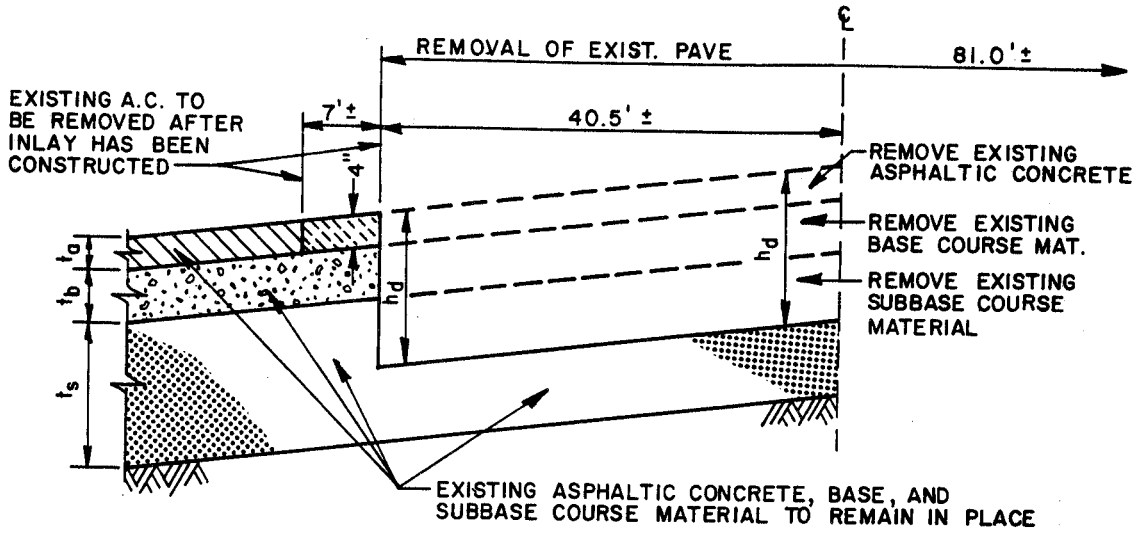
6-2. Rigid inlays in existing flexible pavement. Figure 6-1 shows a section of a typical rigid pavement inlay in an existing flexible pavement.

a. Removal of the existing flexible pavement will be held to the absolute minimum. The depth of the excavation will not exceed the design thickness of the rigid pavement inlay. The width of the excavation of the existing pavement will not exceed the required width of the inlay section plus the minimum necessary, approximately 3 feet, for forming or slipforming the edges of the concrete pavement (fig 6-1).

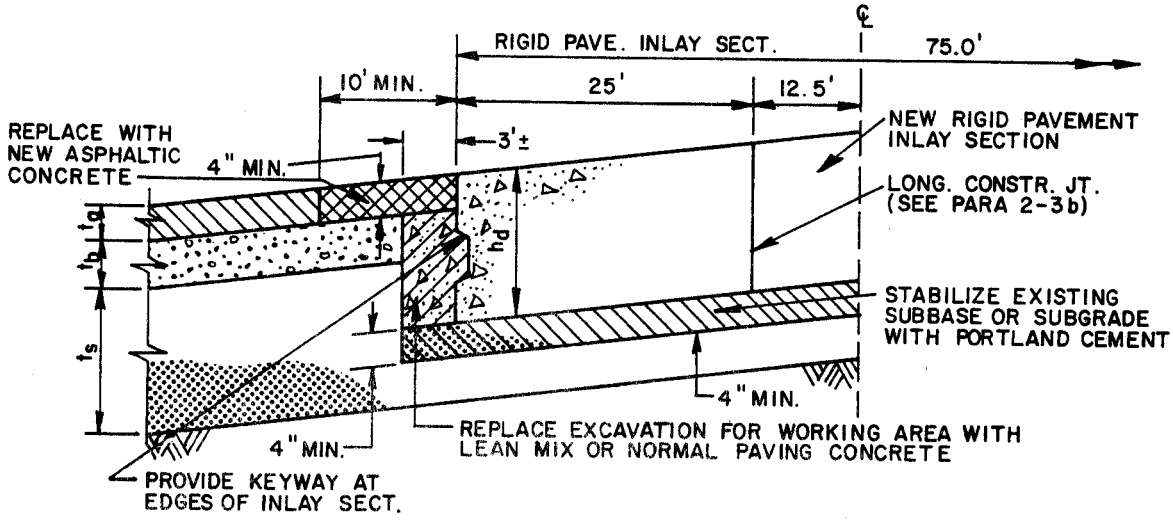
b. Subdrains will be considered only when they are essential to the construction of the inlay section. When required, the subdrains will be placed outside of the edge of the rigid inlay and at least 4 inches below the bottom of the inlay pavement to permit construction of the stabilized layer required in paragraph c. below.

c. Unless the materials in the bottom of the excavation are granular and free-draining or the airfield is located in an arid climate, the bottom full width of the excavation will be scarified to a minimum depth of 4 inches, stabilized with chemicals or bitumens, and recompacted to the density requirements for the top 6 inches of base course or subgrade as specified previously. Reference should be made to EM 1110-3-137 for selection of stabilizing agents and minimum strength requirements.

d. The modulus of soil reaction k used for the design of the rigid pavement relay will be determined on the surface of the material at the bottom of the excavation prior to stabilization. If the strength of the stabilized material does not meet the



TRANSVERSE SECTION SHOWING REMOVAL OF EXISTING FLEXIBLE PAVEMENT FOR RIGID PAVEMENT INLAY SECTION RUNWAYS



TRANSVERSE SECTION SHOWING CONSTRUCTION OF RIGID PAVEMENT INLAY SECTION IN RUNWAYS

LEGEND

h_d Design thickness or rigid pavement
t_a Thickness of existing bituminous concrete
t_b Thickness of existing base-course material
t_s Thickness of existing subbase-course material

NOTE: Sections shown are for 75 foot wide inlays; construction of 100 foot wide inlays will be handled in a similar manner.

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FIGURE 6-1. TYPICAL 75-FOOT-WIDE RIGID PAVEMENT INLAY IN EXISTING FLEXIBLE PAVEMENT

requirements in EM 1110-3-137 for pavement thickness reduction, no structural credit will be given to the stabilized material in the design of the rigid pavement inlay. If the strength of the stabilized layer meets the minimum strength requirement for pavement thickness reduction in EM 1110-3-137, the rigid pavement inlay will be designed in accordance with applicable sections of chapters 2 through 4 pertaining to the use of stabilized soil layers.

e. If the existing pavement is not composed of a depth of nonfrost-susceptible materials sufficient to eliminate substantial frost penetration into an underlying frost-susceptible material, an appropriate reduction in the k value will be made in accordance with EM 1110-3-138. In these cases, the inlay will be designed as a JRC pavement (chap 3) using a minimum of 0.15 percent steel. The pavement thickness may be reduced and longer slabs may be used as applicable to the design of JRC pavements.

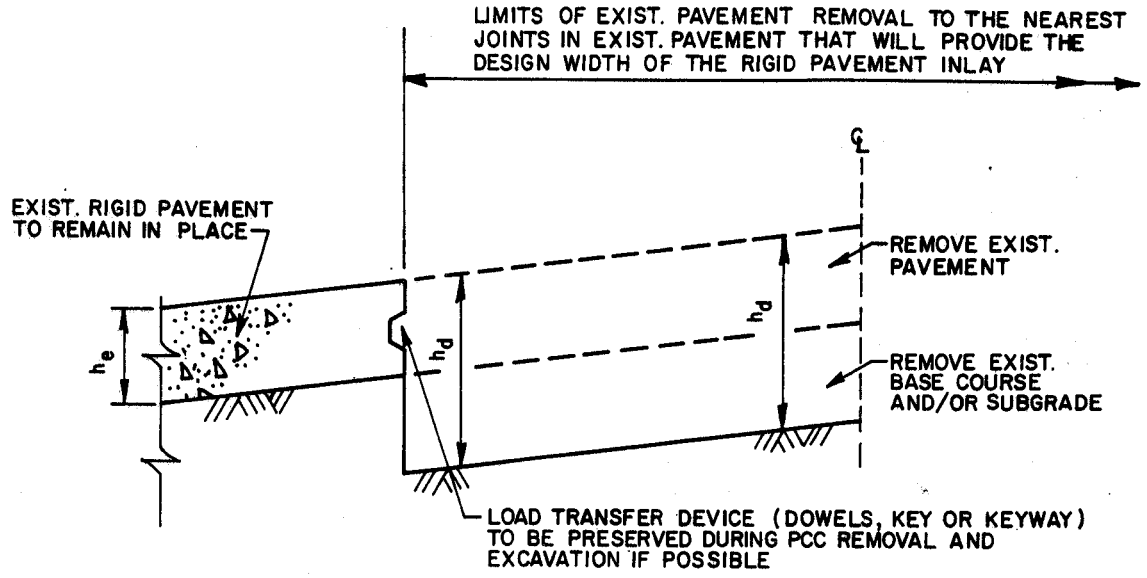
f. After the construction of the rigid pavement inlay, the working areas used for forming or slipforming the sides of the concrete will be backfilled to within 4 inches of the pavement surface with either lean-mix (Econocrete) or normal paving concrete.

g. The existing bituminous concrete will be sawed parallel to and at a distance of 10 feet from each edge of the inlay. The bituminous concrete surface and binder courses and, if necessary, the base course will be removed to provide a depth of 4 inches. The exposed surface of the base course will be recompacted, and a 10-foot-wide paving lane of bituminous concrete, 4 inches thick, will be used to fill in the gap (fig 6-1).

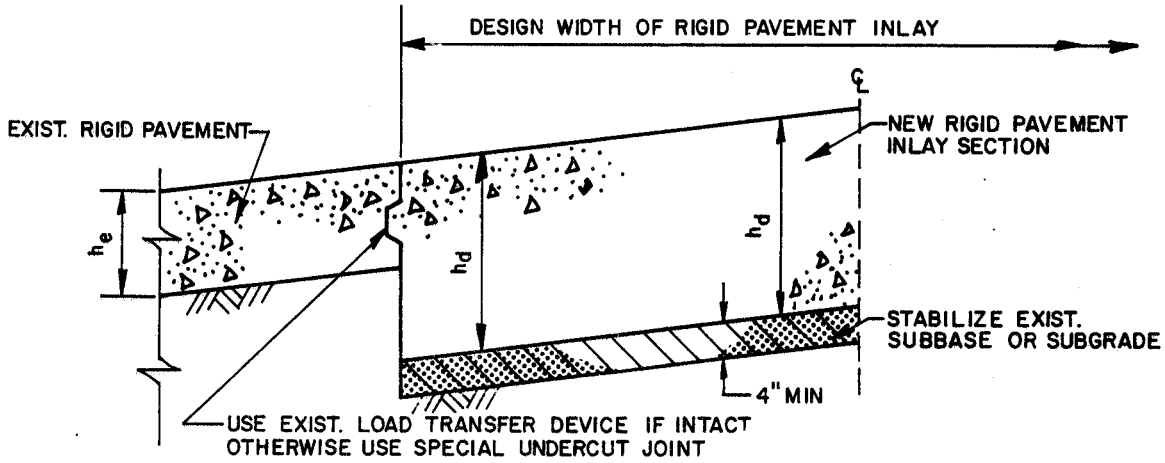
h. In cases where the 10-foot width of new bituminous concrete at either side of the inlay section does not permit a reasonably smooth transition from the inlay to the existing pavement, additional leveling work outside of the 10-foot lane will be accomplished by removal and replacement, planer operation, or both.

6-3. Rigid inlays in existing rigid pavement. Figure 6-2 shows a section of a typical rigid pavement inlay in an existing rigid pavement.

a. The existing rigid pavement will be removed to the nearest longitudinal joints that will provide the design width of the rigid pavement inlay. Care will be exercised in the removal of the existing rigid pavement to preserve the load-transfer device (key, keyway, or dowel) in the longitudinal joint at the edge of the new inlay pavement. If the existing load-transfer devices can be kept intact, they will be used to provide load transfer between the rigid pavement inlay and the existing pavement. If the load transfer devices are damaged or destroyed, the undercut joint shown in figure 2-10 or 3-5 should be used to protect against edge loading of the existing pavement. In



TRANSVERSE SECTION SHOWING REMOVAL OF EXISTING RIGID PAVEMENT FOR RIGID PAVEMENT INLAY SECTION



TRANSVERSE SECTION SHOWING CONSTRUCTION OF RIGID PAVEMENT INLAY SECTION

LEGEND

h_d **Design thickness of rigid pavement for inlay**

h_e **Thickness of existing pavement**

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FIGURE 6-2. TYPICAL RIGID PAVEMENT INLAY IN EXISTING RIGID PAVEMENT

addition to the removal of the existing pavement, the existing base and/or subgrade will be removed to the depth required to the design thickness of the rigid pavement inlay.

b. Paragraphs 6-2b through 6-2e also pertain to rigid pavement inlays in existing rigid pavements.

c. The design of the rigid pavement inlay, including joint types and spacing, will be in accordance with the chapter pertaining to the type of rigid pavement selected.